UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/534,495	05/10/2005	Andrew C. Lewin	124-1118	4506

23117 7590 02/09/2009

NIXON & VANDERHYE, PC
901 NORTH GLEBE ROAD, 11TH FLOOR
ARLINGTON, VA 22203

EXAMINER	
PUNNOOSE, ROY M	

ART UNIT	PAPER NUMBER
2886	

MAIL DATE	DELIVERY MODE
02/09/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/534,495	LEWIN ET AL.	
	Examiner	Art Unit	
	ROY PUNNOOSE	2886	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 October 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 May 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12/15/2008*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Remarks

1. Applicant's arguments filed on 10/29/2008 are acknowledged and has been entered into the records. Claims 1-37 are pending in the application.

2. The Examiner thanks the applicant for correctly pointing out that obviousness-type double patenting (ODP) rejection is not applicable on the instant application because the instant application has the base invention, and the instant application and the two co-pending applications were filed on the same date. Accordingly, the ODP rejection of the previous office action has been withdrawn.

3. With regard to the applicant's remarks on the Examiner's improper rejection, specifically to the format of the specification, the Examiner now believes that there is a possibility that the objected specification, which is the only copy of specification currently on record in the file, may not be the copy of specification that the applicant has been referring to in all the previous communications. The applicant refers to "originally filed specification and drawings (transmitted from WIPO) ..." on page 2 of papers filed on 10/29/2008. It is not clear if the WIPO transmitted said documents directly to the USPTO, or if the applicant filed with USPTO a copy of said WIPO document. To avoid possibility of such misunderstandings, the Examiner has attached a copy of the specification on record to this office action so that the applicant can verify if it is the same document that the applicant has been referring to in all the previous communications.

4. In response to the Examiner's objection to the format of the specification in the previous office actions, the applicant states in part the following:

On page 6, section 9 of the Official Action, the specification is objected to because "the title of the invention is not placed at the top of the first page of the specification."

As previously pointed out to the Examiner in the Request for Reconsideration filed November 13, 2007, the Patent Office is objecting to the arrangement of the specification. Applicant's have previously noted that the objection to the arrangement appears to be an indication that the originally filed specification and drawings (transmitted from WIPO) does not meet the formality requirements of the U.S. Patent and Trademark Office. The Patent Office was reminded that the U.S. Patent and Trademark Office must comply with all articles of the Patent Cooperation Treaty (PCT) including Article 27. It has been held that:

> "if the rule and interpretation of the PTO conflicts with the PCT, it runs afoul of Article 27 of the PCT which provides in part:
>
> (1) No national law shall require compliance with requirements relating to the form or contents of the international application different from or additional to those which are provided for in this Treaty and the Regulations." Caterpillar Tractor v. Commissioner, 231 USPQ 590, 591 (EDVA 1986).

5. It appears that the applicant incorrectly believes that the specification currently on record complies with WIPO/PCT requirements on format of the specification. ***The specification currently on record neither complies with the WIPO/PCT requirements nor the U.S. standards*** on format. The U.S. format requirements were detailed in the previous office action. For the applicant's convenience, the PCT format requirements, specifically about the ***Description/Specification, title*** and the ***headings***, are shown below as it appears in **MPEP 1823.**

PCT Rule 5.1(a) states "The description shall ***first*** state the title of the invention …" and **PCT Administrative Instructions 204** clearly shows what the headings of the parts of the description should be.

1823 [R-5] The Description

PCT Article 5.
The Description

The description shall disclose the invention in a manner sufficiently clear and complete for the invention to be carried out by a person skilled in the art.

PCT Rule 5.
The Description

5.1..

Manner of the Description

(a) The description shall first state the title of the invention as appearing in the request and shall:

(i) specify the technical field to which the invention relates;

PCT Rule 5.

The Description

5.1..

Manner of the Description

(a) The description shall first state the title of the invention as appearing in the request and shall:

(i) specify the technical field to which the invention relates;

(ii) indicate the background art which, as far as known to the applicant, can be regarded as useful for the understanding, searching and examination of the invention, and, preferably, cite the documents reflecting such art;

(iii) disclose the invention, as claimed, in such terms that the technical problem (even if not expressly stated as such) and its solution can be understood, and state the advantageous effects, if any, of the invention with reference to the background art;

(iv) briefly describe the figures in the drawings, if any;

(v) set forth at least the best mode contemplated by the applicant for carrying out the invention claimed; this shall be done in terms of examples, where appropriate, and with reference to the drawings, if any; where the national law of the designated State does not require the description of the best mode but is satisfied with the description of any mode (whether it is the best contemplated or not), failure to describe the best mode contemplated shall have no effect in that State;

(vi) indicate explicitly, when it is not obvious from the description or nature of the invention, the way in which the invention is capable of exploitation in industry and the way in which it can be made and used, or, if it can only be used, the way in which it can be used; the term "industry" is to be understood in its broadest sense as in the Paris Convention for the Protection of Industrial Property.

(b) The manner and order specified in paragraph (a) shall be followed except when, because of the nature of the invention, a different manner or a different order would result in a better understanding and a more economic presentation.

(c) Subject to the provisions of paragraph (b), each of the parts referred to in paragraph (a) shall preferably be preceded by an appropriate heading as suggested in the Administrative Instructions.

PCT Administrative Instructions 204.

Headings of the Parts of the Description

The headings of the parts of the description should be as follows:

(i) for matter referred to in Rule 5.1(a)(i), "Technical Field";

(ii) for matter referred to in Rule 5.1(a)(ii), "Background Art";

(iii) for matter referred to in Rule 5.1(a)(iii), "Disclosure of Invention";

(iv) for matter referred to in Rule 5.1(a)(iv), "Brief Description of Drawings";

(v) for matter referred to in Rule 5.1(a)(v), "Best Mode for Carrying Out the Invention," or, where appropriate, "Mode(s) for Carrying Out the Invention";

(vi) for matter referred to in Rule 5.1(a)(vi), "Industrial Applicability";

6. While reviewing the claims and conducting prior art search, the Examiner has discovered prior art relevant to applicants claimed invention. In the interest of expediency and efficiency, the Examiner brought said prior art to SPE T. Chowdhury's attention. A decision was made to have a telephonic interview with the applicant's representative, Atty. Stanley C. Spooner, to discuss the relevancy of the prior art to the claims, specifically claim 1.

Interview

7. On Thursday, 08 January 2009 the Examiner indicated to SPE T. Chowdhury that prior art Tiao et al (U. S. Patent 6,318,863) read on several claims of the instant application, primarily claim 1. In the interest of expediency, it was decided that SPE Chowdhury telephone Atty. Spooner to discuss the Examiner's finding. Atty. Spooner stated that he will call back on Monday, 12 January 2009 after discussing the matter with the inventors.

In the interview on Monday, 12 January 2009, Atty. Spooner argued that claim 1 has allowable subject matter because prior art Tiao et al (U.S Patent 6,318,863) does not teach the following:

a. A "structured light generator" for illuminating a scene (as in the preamble of claim 1);

b. The "projection optics arranged together with said light source and said light guide" so as to project an array of distinct images of the light source towards the scene; and,

c. A "projection lens" for projecting light to a scene (compared to prior art using a condenser lens for projecting light to a scene).

In response to Atty. Spooner's arguments, the Examiner and SPE Chowdhury contended that the prior art uses the principles of kaleidoscope which is the same principle that is used in

applicant's claimed invention. The Examiner and SPE Chowdhury further contended that all the elements, the light source, the light guide and the projection lens as claimed in claim 1 of the instant application are clearly taught by prior art Tiao et al, specifically in col.10, line 65 – col.11, line 15, and Figure 11.

No agreement was reached. At the conclusion of the interview SPE Chowdhury indicated to Atty. Spooner that the Office's position will be conveyed to the applicant via an office action.

Review and Search

8. After careful review of the instant application and search for prior art, subsequent to the above interview, the Examiner has noted several deficiencies in the drawings and claims, and discovered additional prior art that is relevant to applicant's claimed invention as detailed in the objections and rejections below.

Allowability

9. In view of prior art discovered that is relevant to applicant's claimed invention, any allowability of claims indicated in any of the previous office action(s) has been withdrawn.

Specification

10. The disclosure is objected to because the specification currently on record neither complies with the WIPO/PCT requirements nor the U.S. standards on format as indicated in the previous office action. See MPEP 1823; PCT Rule 5.1(a); PCT Administrative Instructions 204. Appropriate correction is required.

11. The specification is objected to because reference character "68" has been used to designate both "projection lens" and "LED" (see relevant paragraphs on pages 15-16 and Figure 6). Appropriate correction is required.

Drawings

12. The drawings are objected to under 37 CFR 1.83(a). The drawings must show ***every feature*** of the invention ***specified in the claims.*** Therefore, the following must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

a. First distance and second distance (as claimed in claims 14 and 15);

b. Reflection axis (as claimed in claim 23);

c. Light source not symmetric about reflection axis (as claimed in claim 23);

d. Mask having various transmissive characteristics (as claimed in claims 29-31);

e. Axes of reflection of the light guide (as claimed in claim 17);

f. Light source arranged to run from one side of the input face to another (as claimed in claims 25, 33);

g. Mask with modulator (as claimed in claim 34); and,

h. Homogenizer disposed between the light source and the mask (as claimed in claim 35).

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be

labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

13. The drawings are objected to because in Figures 5, 6 and 7 the drawings do not have any labels or reference numbers indicating what they represent. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

14. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "68" has been used to designate both "projection lens" and "LED" (see Figure 6). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should

include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

15. Claim 13 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 13 is objected to because it does not further limit the structure of its parent claim, claim 1.

Claim Rejections - 35 USC § 112

16. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

17. **Claims 5, 14, 15, 20, 21 and 27** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

18. With regard to claim 5, a broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and

Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claim 5 recites the broad recitation 1 to 50 mm^2, and the claim also recites 2 to 25 mm^2 which is the narrower statement of the range/limitation. Appropriate correction is required.

19. With regard to claim 14, "**preferably** adapted" is vague terminology because "preferable" is a relative term meaning "more desirable." There is a lack of certainty in the term "preferably." This has made the claim vague and indefinite. Appropriate correction is required.

20. With regard to claim 14, "**expected range** of operation" is not clearly defined and has made the claim vague and indefinite. Appropriate correction is required.

21. With regard to claim 15, "**may be** larger" is indefinite terminology and has made the claim vague and indefinite because there is a lack of certainty in the "may be" terminology. Appropriate correction is required.

22. With regard to claim 20, "**can be** used" is indefinite terminology and has made the claim vague and indefinite. It only indicates a possible or potential for usage and not a definite usage. Appropriate correction is required.

23. With regard to claim 21, the recitation "one light source emits light … to another light source" has made the claim vague and indefinite because it creates the perception that light from

one light source is directed at another light source. For examination purposes it is assumed that the intended meaning is that the claimed apparatus has light sources that emit light at different wavelengths. Appropriate correction is required.

24. With regard to claim 27, **"may is adapted"** is indefinite terminology and has made the claim vague and indefinite. Appropriate correction is required.

Claim Rejections - 35 USC § 102

25. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> **A person shall be entitled to a patent unless –**
>
> **(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.**

26. Claim 1, 2, 3, 6, 9, 16-18, 21-23 are rejected under 35 U.S.C. 102(b) as being anticipated by KUCHITSU (JP 62007019 A).

27. **Claim 1** is rejected because Kuchitsu teaches of:

A structured light generator **(see Fig.1)** for illuminating a scene **5** comprising;

a light source **3, 6** (see Figures 1 and 2) arranged to illuminate part of the input face of a light guide **1a**, the light guide **1a** comprising a tube having substantially reflective sides; and,

projection optics **4** arranged together with said light source **3, 6** and said light guide **1a** so as to project an array of distinct images **(see Fig.3)** of the light source **3, 6** towards the scene **5 (see abstract)**.

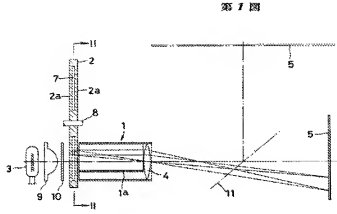


Figure 1. Structured light generating apparatus (JP 62007019 A)

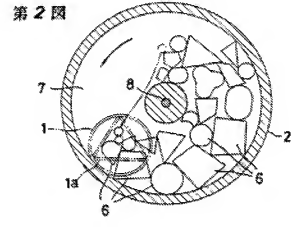


Figure 2. Structured light generating apparatus (JP 62007019 A)

Note: It is noted that colored transparent small chips **6** in combination with lamp **3** effectively forms a source of light to illuminate part of the input face of the light guide **1a** having reflective sides.

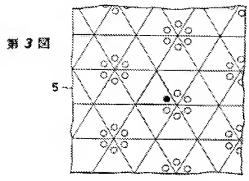


Figure 3. Array of distinct images (JP 62007019 A)

28. **Claim 2** is rejected for the same reasons of rejection of claim 1 as above and because Kuchitsu teaches that the light guide comprises a tube having a constant cross section. Kuchitsu discloses that the light guide is formed as a kaleidoscope in a cylindrical body **1** having constant cross-section (see abstract and Figure 1).

29. **Claim 3** is rejected for the same reasons of rejection of claims 1 and 2 as above and because Kuchitsu teaches that the cross-section of the tube is a regular polygon because three reflecting mirror surfaces 1a are arranged as a kaleidoscope to form the light guide (see abstract and Figure 1).

30. **Claim 6** is rejected for the same reasons of rejection of claim 1 as above and because Kuchitsu teaches that the light guide comprises a hollow tube with three reflecting mirror surfaces **1a** and arranged as a kaleidoscope to form the light guide (see abstract and Figure 1).

31. **Claim 9** is rejected for the same reasons of rejection of claim 1 as above and because Kuchitsu teaches that the projection optics comprises a projection lens **4** (see abstract and Figure 1).

32. **Claim 16** is rejected for the same reasons of rejection of claim 1 as above and because Kuchitsu teaches that the light source has a non-circular shape. It is evident from Figure 4 that the colored transparent small chips **6** which in combination with lamp **3** effectively forms a source of

light to illuminate part of the input face of the light guide **1a** have non-circular shape (see second paragraph on page 9 of Kuchitsu translation and Figure 4).

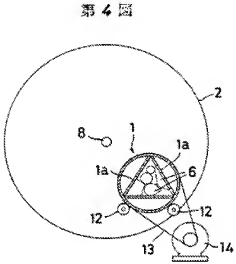


Figure 4. Structured light generating apparatus (JP 62007019 A)

33. **Claim 17** is rejected for the same reasons of rejection of claim 16 as above and because Kuchitsu teaches that the light source has a non-circular shape that is not symmetric about the axes of reflection of the light guide. It is evident from Figure 4 that the colored transparent small chips **6** which in combination with lamp **3** effectively forms a source of light to illuminate part of the input face of the light guide **1a** have non-circular shape and not symmetric about the axes of reflection of the light guide (see second paragraph on page 9 of Kuchitsu translation and Figure 4).

34. **Claim 18** is rejected for the same reasons of rejection of claim 1 as above and because Kuchitsu teaches of more than one light source, each light source arranged to illuminate part of the input face of the light guide. It is evident from Figure 4 that the colored transparent small chips **6**

which in combination with lamp **3** effectively form a source of light to illuminate part of the input face of the light guide **1a** (see second paragraph on page 9 of Kuchitsu translation and Figure 4).

35. **Claim 21** is rejected for the same reasons of rejection of claim 18 as above and because Kuchitsu teaches of at least one light source emits light at a different wavelength to another light source (see second paragraph on page 9 of Kuchitsu translation).

36. **Claim 22** is rejected for the same reasons of rejection of claim 18 as above and because Kuchitsu teaches of at least one light source is shaped differently from another light source. It is evident from Figure 4 that each of the colored transparent small chips **6** *having different shapes* which in combination with lamp **3** effectively forms a source of light to illuminate part of the input face of the light guide **1a** (see second paragraph on page 9 of Kuchitsu translation and Figure 4).

37. **Claim 23** is rejected for the same reasons of rejection of claim 18 as above and because Kuchitsu teaches that at least one light source has a shape that is not symmetric about a reflection axis of the light guide. It is evident from Figure 4 that each of the colored transparent small chips **6** which in combination with lamp **3** effectively forms a source of light to illuminate part of the input face of the light guide **1a** (see second paragraph on page 9 of Kuchitsu translation and Figure 4) and is not symmetric about a reflection axis of the light guide.

Claim Rejections - 35 USC § 103

38. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> **(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.**

39. Claims 14-15, 25-34 and 36-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuchitsu (JP 62007019 A).

40. **Claims 14 and 15** are rejected because:

A. Kuchitsu teach all claim limitations including ***a projector lens*** in a structured light generator for projecting an array of distinct images of light source towards a scene for displaying complex patterns of light on the scene for various purposes.

B. Kuchitsu teaches of only one type of projection optics/lens, and is silent on various other types of projection optics/lens that would provide a substantially focused image at a first distance and a substantially unfocussed image at a second distance in which the first distance may be larger than the second distance, in a structured light generator for projecting an array of distinct images of light source towards a scene for displaying complex patterns of light on the scene for various purposes.

C. The Examiner takes official notice that in view of Kuchitsu's teaching of one type of projection optics/lens, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute Kuchitsu's projection optics/lens with an alternate type of projection optics/lens that would provide a substantially focused image at a first distance and a substantially unfocussed image at a second distance in which the first distance may be larger than the second distance due to the fact that such projection optics/lens would provide a depth of field suitable for desired focus field in a structured light generator for projecting an array of distinct images of light source towards a scene for displaying complex patterns of light on the scene for various purposes.

41. **Claims 25-34** are rejected because the Examiner takes official notice that all the limitations/features claimed in claims 25-34 are either taught by Kuchitsu or are obvious variations in view of Kuchitsu's teachings in view of the following disclosure by Kuchitsu (see second paragraph on page 9 of Kuchitsu translation):

> Furthermore, besides using the colored translucent sheet-like small piece in the object in the present invention, a small piece with a picture, pattern and writing is suitable as well. In this case, when a plurality of types of small pieces with different colors, shapes, sizes and the like are combined, a pattern having further changes can be obtained. Moreover, besides this, a flash lamp, light-emitting diode and the like are incorporated in the object itself and used as a luminant and a pattern made by using light may be projected onto the screen.

Note: Kuchitsu's colored transparent small chips **6** having different shapes would qualify under the broad term of "mask" and the rotating disc containing the colored chips would qualify under the broad term of "modulator".

42. **Claim 36** is rejected because:

A. Kuchitsu teach all claim limitations except that the generator projects an array of images over an angle of between 50 degrees to 100 degrees in a structured light generator for projecting an array of distinct images of light source towards a scene for displaying complex patterns of light on the scene for various purposes.

B. Kuchitsu's apparatus comprises a lens 4 (see Figure 1) to project structured light exiting the light guide on to a scene/screen in a structured light generator for projecting an array of

distinct images of light source towards a scene for displaying complex patterns of light on the scene for various purposes.

C. The Examiner takes official notice that in view of Kuchitsu's teaching of using a projection lens to project an image onto a scene/screen, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select or substitute Kuchitsu's lens with any of different types of lenses, in this instance a lens with a desired focal length and/or magnification to have a projection angle of between 50 degrees to 100 degrees due to the fact that such a projection angle would provide a desired size of image on the scene/screen in a structured light generator for projecting an array of distinct images of light source towards a scene/screen for displaying complex patterns of light on the scene/screen for various purposes.

43. **Claim 37** is rejected because:

A. Kuchitsu teach all claim limitations except that the generator has a depth of field of 100 mm to infinity in a structured light generator for projecting an array of distinct images of light source towards a scene for displaying complex patterns of light on the scene for various purposes.

B. Kuchitsu's apparatus comprises a lens 4 (see Figure 1) to project structured light exiting the light guide on to a scene/screen in a structured light generator for projecting an array of distinct images of light source towards a scene for displaying complex patterns of light on the scene for various purposes.

C. The Examiner takes official notice that in view of Kuchitsu's teaching of using a projection lens to project an image onto a scene/screen, it would have been obvious to one of ordinary

skill in the art at the time the invention was made to select or substitute Kuchitsu's lens with any of different types of lenses, in this instance a lens with a desired depth of field, specifically a depth of field of 100 mm to infinity due to the fact that such depth of field would provide a focused image to be projected over a wide range of depth in a structured light generator for projecting an array of distinct images of light source towards a scene/screen for displaying complex patterns of light on the scene/screen for various purposes.

44. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuchitsu (JP 62007019 A) in view of Tarsa et al (U.S. Patent 6,350,041 B1).

45. **Claim 24** is rejected because:

A. Kuchitsu teach all claim limitations except that at least one light source is located within the light guide, at a different depth to another light source in a structured light generator for projecting an array of distinct images of light source towards a scene for displaying complex patterns of light on the scene for various purposes.

B. Tarsa et al (Tarsa hereiafter) teaches of various locations at which light source(s) 31 may be placed/arranged (see col.5, line 34 - col.6, line 47; Figures 3a-3d), and specifically at least one light source 31 located within the light guide (see Figure 3b), in a structured light generator for projecting patterns of light (see col.3, lines 17-18) towards a scene.

C. In view of Tarsa's teaching of having at least one light source located within the light guide and various other arrangements, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate any of the particular placement/arrangement of light source(s) as shown by Tarsa in Figures 3a-3d, ***or a***

combination thereof, to have one light source located within the light guide at a different depth to another light source, into Kuchitsu's apparatus due to the fact that it would provide an increased number of complex projection patterns in a structured light generator for projecting an array of distinct images/patterns of light source towards a scene for displaying complex patterns of light on the scene for various purposes.

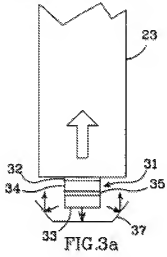


FIG.3a

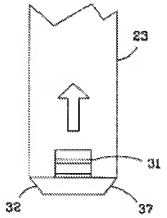


FIG.3b

46. Claims 4, 7 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuchitsu (JP 62007019 A) in view of Tiao et al (U. S. Patent 6,318,863).

47. Prior art Kuchitsu and Tiao uses the principle of kaleidoscope which is the same principle that is used in applicant's claimed invention.

A kaleidoscope generates symmetrical reflections of light.

Webster's II New Riverside University Dictionary defines "kaleidoscope" as "a tube-shaped optical instrument rotated to produce successive symmetric designs by means of mirrors reflecting the continuously changing patterns made by bits of colored glass at an end of the tube."

The applicant's claimed structure comprises three elements: a light source, a tube with reflective sides, and optics for projecting light on to a scene. Prior art Kuchitsu and Tiao have structures substantially similar to the applicant's claimed invention. The principle involved in the applicant's claimed invention and the prior art are the same – the principle of kaleidoscope, in which light from a light source entering one end of a tube having reflective walls generates symmetrical reflections of light inside the tube, and symmetrically reflected light exiting at the other end of the tube is projected toward a scene by an optical element.

Prior art Tiao characterizes the tube an "integrator" because it generates uniform light reflections. The ***uniformity*** of light is achieved by ***symmetrical reflections of light.***

The applicant characterizes the tube a "structured light generator" because it generates ***symmetrical reflections of light.***

48. **Claim 4** is rejected because:

A. Kuchitsu teach all claim limitations except that the tube has a square cross section in a structured light generator for projecting an array of distinct images of light source towards a scene for displaying complex patterns of light on the scene for various purposes.

B. Tiao et al (Tiao hereinafter) teaches of an apparatus comprising a tube that has four walls and a rectangular cross section (see col.10, line 65 – col.11, line 15, and Figures 1B and 11;

specifically col.11, line 10) in a structured light generator for projecting images of light source towards a screen/scene (see title and abstract, specifically image projection).

C. In view of Tiao's teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the triangular cross-section tube in Kuchitsu's apparatus with a square cross section tube due to the fact that a squire cross-section would provide more light reflections and therefore more distinct light patterns projected onto a scene/screen in a structured light generator for projecting an array of distinct images of light source towards a scene/screen for displaying complex patterns of light on the scene/screen for various purposes.

Note: It should be noted that a square is a special case of rectangle. Further, Tiao's condenser lens would qualify under the broad term of "projection optics."

49. **Claim 7** is rejected because:

A. Kuchitsu teach all claim limitations except that the light guide comprises a tube of solid material adapted such that a substantial amount of light incident at an interface between the material of the tube and surrounding material undergoes total internal reflection in a structured light generator for projecting an array of distinct images of light source towards a scene for displaying complex patterns of light on the scene for various purposes.

B. Tiao et al (Tiao hereinafter) teaches of an apparatus comprising a tube that has four walls and a rectangular cross section (see col.10, line 65 – col.11, line 15, and Figures 1B and 11; specifically col.11, lines 3-6) in a structured light generator for projecting images of light source towards a screen/scene (see title and abstract, specifically image projection).

C. In view of Tiao's teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the triangular cross-section tube in Kuchitsu's apparatus with a tube of solid material due to the fact that a tube of solid material is easier to manufacture and maintain and therefore would provide cost savings in a structured light generator for projecting an array of distinct images of light source towards a scene/screen for displaying complex patterns of light on the scene/screen for various purposes.

50. **Claim 19** is rejected because:

A. Kuchitsu teach all claim limitations except that the light sources are arranged in a regular pattern in a structured light generator for projecting an array of distinct images of light source towards a scene for displaying complex patterns of light on the scene for various purposes.

B. Tiao et al (Tiao hereinafter) teaches of an apparatus comprising light sources 50a, 202, 202a that are arranged in a regular pattern (see Figures2A, 2B and 11) in a structured light generator for projecting images of light source towards a screen/scene (see title and abstract, specifically image projection).

C. In view of Tiao's teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate light sources arranged in a regular pattern into Kuchitsu's apparatus due to the fact that it would provide more complex light projection patterns from a source light pattern in a structured light generator for projecting an array of distinct images/patterns of light source towards a scene/screen for displaying complex patterns of light on the scene/screen for various purposes.

51. Claims 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuchitsu (JP 62007019 A) in view of Tiao et al (U. S. Patent 6,318,863) and further in view of Tarsa et al (U.S. Patent 6,350,041 B1).

52. **Claim 10** is rejected because:

A. Kuchitsu and Tiao teach all claim limitations except that the tube of solid material is shaped at the output face to form a projection lens in a structured light generator for projecting images of light source towards a screen/scene.

B. Tarsa et al (Tarsa hereinafter) teaches of an apparatus comprising a solid tube/light guide having an output face 26 to form a projection lens (see col.5, lines 13-27 – specifically lines 24-27, and Figure 2) in a structured light generator for projecting patterns of light (see col.3, lines 17-18) towards a scene.

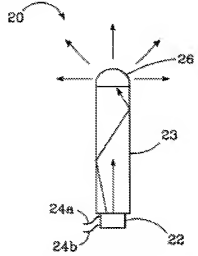


FIG.2

U. S. Patent 6,350,041 B1

C. In view of Tarsa's teaching of having an output face of a light guide to form a projection lens, it would have been obvious to one of ordinary skill in the art at the time the invention

was made to incorporate such a structure into Kuchitsu's and Tiao's teachings, specifically into Tiao's teaching, for having the output face of the light guide to form a projection lens due to the fact that such a combined/consolidated part would eliminate any lens versus tube alignment problems and provide cost savings due to having a single part in a structured light generator for projecting an array of distinct images of light source towards a scene/screen for displaying complex patterns of light on the scene/screen for various purposes.

53. **Claim 11** is rejected because Tarsa teaches of a hemispherical projection lens 26 (see col.5, lines 13-27 – specifically lines 24-27, and Figures 2) at the output face of a light guide in a structured light generator for projecting patterns of light (see col.3, lines 17-18) towards a scene. In view of Tarsa's teaching of having a hemispherical projection lens at the output face of a light guide, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate such a hemispherical projection lens into Kuchitsu's and Tiao's teachings, specifically into Kuchitsu's teaching, due to the fact that a hemispherical projection lens would provide a wider angle of projection for projecting larger size images in a structured light generator for projecting an array of distinct images of light source towards a scene/screen for displaying complex patterns of light on the scene/screen for various purposes.

54. **Claim 12** is rejected because Tarsa teaches that centre of the hemispherical lens is located at the centre of the output face of the light guide (see Figures 2, 5a, 5b, 5c). In view of Tarsa's teaching of having a hemispherical projection lens located at the centre of the output face of the light guide, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate such a hemispherical projection lens at the centre of the output face of the light guide into Kuchitsu's and Tiao's teachings, specifically into Kuchitsu's teaching, due to the

fact that a hemispherical projection lens at the centre of the output face of the light guide would provide a symmetrical pattern projected onto a scene with a structured light generator for projecting distinct images or patterns of light source towards a scene/screen for displaying complex patterns of light on the scene/screen for various purposes.

55. **Claim 13** is rejected for the same reasons of rejection of claim 12 and because it is obvious to one of ordinary skill in the art that when a hemispherical projection lens located at the centre of the output face of the light guide, as claimed in claim 12, an image or pattern projected towards the scene would have a common point of origin.

56. Claims 5, 8 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuchitsu (JP 62007019 A) in view of Tiao et al (U. S. Patent 6,318,863) and further in view of Kurosawa et al (U.S. Patent 6,373,026 B1).

57. **Claims 5, 8 and 20** are rejected because:

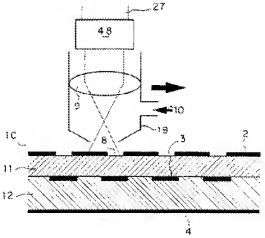
A. Kuchitsu and Tiao teach all claim limitations except for (a) a specific cross sectional area of the light guide as claimed in claim 5, (b) a specific length of the light guide as claimed in claim 8, and (c) the light sources are arranged such that different arrangements of sources can be used to provide differing spot densities, in a structured light generator for projecting an array of distinct images of light source towards a scene for displaying complex patterns of light on the scene for various purposes.

B. Kurosawa et al (Kurosawa hereinafter) teaches of an apparatus comprising a kaleidoscope 48 in which the light source and light guide dimensions of the kaleidoscope are selected to provide a desired spot sizes and therefore spot densities (see col.16, lines 1-4, lines 18-22,

and Figure 15) in a structured light generator for projecting images of light source towards a scene.

U.S. Patent Apr. 16, 2002 Sheet 8 of 18 US 6,373,026 B1

FIG 15



C. In view of Kurosawa's teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate Kurosawa's teachings into Kuchitsu's apparatus due to the fact that it would provide an apparatus that can project precise light patterns onto a scene/screen in a structured light generator for projecting an array of distinct images/patterns of light source towards a scene/screen for displaying complex patterns of light on the scene/screen for various purposes.

58. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuchitsu (JP 62007019 A) in view of Tiao et al (U. S. Patent 6,318,863) and further in view of Shimomukai (U.S. Patent 5,757,548).

59. **Claim 35** is rejected because:

A. Kuchitsu and Tiao teach all claim limitations except that a homogeniser is disposed between the light source and the mask, in a structured light generator for projecting an array of distinct images of light source towards a scene for displaying complex patterns of light on the scene for various purposes.

B. Shimomukai teaches of an apparatus comprising a kaleidoscope in which a homogenizer/diffuser 3 (see abstract; col.6, lines 57-64; Figure 2) is disposed between the light source and the input face of the kaleidoscope, in a structured light generator for projecting an array of distinct images of light source towards a scene for displaying complex patterns of light on the scene for various purposes.

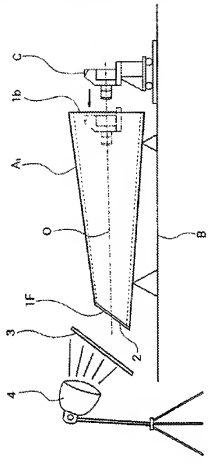


FIG. 2

C. In view of Shimomukai's teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate Shimomukai's teachings into Kuchitsu's apparatus due to the fact that it would provide an apparatus that can project soft light patterns onto a scene/screen in a structured light generator for projecting an array of distinct soft images/patterns of light source towards a scene/screen for displaying complex patterns of light on the scene/screen for various purposes.

60. The Examiner has taken official notice in rejecting several claims as detailed above because the claimed subject matter is well-known in the art.

61. Several facts have been relied upon from the personal knowledge of the examiner about which the examiner took Official Notice in this office action. Applicant must seasonably challenge well known statements and statements based on personal knowledge when they are made. In re Selmi, 156 F.2d 96, 70 USPQ 197 (CCPA 1946); In re Fischer, 125 F.2d 725, 52 USPQ 473 (CCPA 1942). See also In re Boon, 439 F.2d 724, 169 USPQ 231 (CCPA 1971) (a challenge to the taking of judicial notice must contain adequate information or argument to create on its face a reasonable doubt regarding the circumstances justifying the judicial notice). If applicant does not seasonably traverse the well-known statement during examination, then the object of the well-known statement is taken to be admitted prior art. In re Chevenard, 139 F.2d 71, 60 USPQ 239 (CCPA 1943). A seasonable challenge constitutes a demand for evidence made as soon as practicable during prosecution. Thus, applicant is charged with rebutting the well-known statement in the **next reply** after the Office action in which the well known statement was made.

62. The prior art cited in the accompanying PTO-892 is made of record and not relied upon, **are considered pertinent** to applicant's disclosure.

Contact/Status Information

63. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Roy M. Punnoose** whose telephone number is **(571)272-2427**. The examiner can normally be reached on 9:30 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Tarifur R. Chowdhury** can be reached on **571-272-2287**. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roy M. Punnoose/
Primary Examiner
Art Unit 2886